Washington State Department of Health

ELABORATIONS

News and Issues for Washington's Clinical Laboratories

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West Nile Virus: The Ins and Outs of Laboratory Testing

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As of August 1, 2005, West Nile virus (WNV) activity has not been found in Washington state - yet. In 2002, four birds and two horses in Washington were found to be infected with West Nile virus, however the virus did not become established. In the past few years, several WNV infections have been diagnosed in Washington residents that have been exposed to mosquitoes in other states. There have also been more than four false positive test results.

Suspicion of WNV infection is based on clinical symptoms and patient history. The symptoms are common to many infections, so laboratory testing is required for a confirmed diagnosis. The most commonly used diagnostic laboratory test for WNV infection measures IgM antibodies in serum or cerebrospinal fluid (CSF) using an IgM antibody capture enzyme-linked immunosorbent assay (MAC-ELISA). This test is best performed on serum collected at least 8 days after symptoms start.

The MAC-ELISA for WNV is used by Washington State Public Health Laboratories (PHL), Centers for Disease Control and Prevention (CDC), and many private laboratories. Positive WNV test results are required to be reported to public health authorities in Washington. The Washington State PHL will confirm private laboratory results in their own laboratory before officially reporting WNV cases.

PCR is not recommended for routine diagnosis of WNV in people since the virus is not reliably detectable in blood or CSF after a person becomes ill. PCR is used to identify WNV in brain tissue of horses, birds, or for people with special circumstances, e.g. in a person with impaired immune function.

A newer test, the microsphere-based immunologic assay (MIA), is being used at the PHL to identify infection with West Nile virus and St Louis encephalitis virus. Advantages of this assay include a shorter turn around time, and more specimens can be run simultaneously. The assay is an antigen/antibody test similar to ELISA, except instead of being attached to a plate, the assay components are attached to microspheres, and the results are read using a modified flow cytometer. In a positive

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Inside This Issue

Practice Guidelines

The following practice guidelines have been developed by the Clinical Laboratory Advisory Council. They can be accessed at the following website:
www.doh.wa.gov/lqa.htm

- Anemia
- ANA
- Bioterrorism Event Mgmt
- Bleeding Disorders
- Chlamydia
- Diabetes
- Group A Strep Pharyngitis
- Hepatitis
- HIV
- Infectious Diarrhea
- Intestinal Parasites
- Lipid Screening
- PAP Smear
- Point-of-Care Testing
- PSA
- Rash Illness
- Red Cell Transfusion
- Renal Disease
- STD
- Thyroid
- Tuberculosis
- Urinalysis
- Wellness

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reaction, IgM antibody from patient serum or CSF binds to the bead-antigen complex; the laser detects the color of beads which are quantified and differentiated.

Information about this test is available on the following websites:

http://www.cdc.gov/ncidod/dvbid/westnile/conf/2005ppt/janejohnson.ppt#274

http://www.luminexcorp.com/01_xMAPTechnology/08_Tutorials/How_xmap_works

The confirmatory West Nile virus test is a plaque reduction neutralization test [PRNT]. Confirmation is needed when:

- Cases are found in an area that has not previously had evidence of human WNV illness.
- Laboratory results are not definitive (equivocal laboratory testing results).
- The patient might have been exposed to other closely related viruses (like St. Louis encephalitis virus) which may result in a cross reactive laboratory test.
- There may have been an unusual exposure (e.g. through transfusion of blood products, breastfeeding or in utero, during a laboratory accident, or tansplantation of an organ).

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Website addresses:
DOH home page: http://www.doh.wa.gov
LQA home page: http://www.doh.wa.gov/lqa.htm
PHL home page:
http://www.doh.wa.gov/EHSPHL/PHL/default.htm

PRNT testing requires a Biosafety Level 3 laboratory and because the virus is cultured, it takes well over a week to conduct.

Q: How should commercial laboratories interact with PHL in diagnosing people with West Nile virus infection?
A: All positive tests for arboviral diseases including West Nile virus should be reported to public health authorities (WAC 246-101). Specimens should be saved so that they can be sent to PHL if requested. WNV infection diagnosed in people is also reported to public health by hospitals and health care providers. Local health jurisdictions perform epidemiological investigations to collect clinical and epidemiological information. That information is combined with laboratory testing to classify cases. "Confirmed" and "probable" cases are reported to the CDC's national arboviral disease database, Arbonet.

Q: If a test is a "false positive" what does that mean?
A: When there is a low prevalence of a disease in the community, "false positive " test results happen when an initial test indicates that a person has a West Nile infection, but a second laboratory cannot confirm the result. Once WNV activity is established and circulating in birds and mosquitoes in Washington, the diagnosis of human illness will become easier. It is important to the Department of Health to get an accurate idea of where people are being infected in order to look at trends and focus prevention and control efforts.

Q: Where can I find out more about West Nile virus infection?
A: Two new comprehensive journal articles that are available on line about West nile virus are:

1. Hayes EB, Komar N, Nasci RS, Montgomery SP, O'Leary DR, Campbell GL. Epidemiology and Transmission Dynamics of West Nile Virus Disease. Emerg Infect Dis [serial on the Internet]. 2005 Aug [*date cited*]. Available from http://www.cdc.gov/ncidod/EID/vol11no08/05-0289a.htm.

2. Hayes EB, Sejvar JJ, Zaki SR, Lanciotti RS, Bode AV, Campbell GL. Virology, Pathology, and Clinical Manifestations of West Nile Virus Disease. Emerg Infect Dis [serial on the Internet]. 2005 Aug [*date cited*]. Available from http://www.cdc.gov/ncidod/EID/vol11no08/05-0289b.htm.

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Recommendations to Protect Laboratory and Clinical Workers from West Nile Virus Exposure
Occupational Risk: The following recommendations are for laboratory and clinical workplaces in which transmission of WNV may occur by means other than mosquito bite. Until further studies determine the risk of WNV infection from exposure to infected persons, animals, fluids, or tissues, it is prudent public health practice to minimize such potentially infectious contacts. These are basic recommendations to reduce exposure to blood and other tissues from WNV-infected animals or persons. More stringent protective equipment and work practices should be used when warranted. Biosafety guidelines are available for working with WNV and other microbiological agents in the laboratory.

Recommendations for workers:

- Use personal protective equipment that provides barrier protection including gloves, gowns, safety glasses, and/or face shields to avoid dermal and mucous membrane contact with blood and other tissues.
    - Workers conducting necropsies should wear gloves that prevent cutting injuries, such as stainless steel mesh gloves, in addition to medical examination gloves.
- Wash hands and other skin surfaces with soap and water immediately after contact with blood or other tissues, after removing gloves, and before leaving the workplace.
- Minimize the generation of aerosols.
- Handle sharp instruments carefully during use.
- Use medical devices with safety features when available to avoid sharps-related injuries.
- Avoid recapping needles.
- Dispose of sharp instruments carefully after use.
- Report to the supervisor all needlestick and other sharps-related injuries.
- Report to the supervisor any laboratory incidents or accidents involving possible WNV exposure.
- Report to the supervisor any symptoms consistent with WNV infection.

Basic Blood Cell Morphology Training Class

DATE, TIME & LOCATION: September 21 **OR** 22, 2005, from 8:00 a.m to 3:00 p.m at the DOH Public Health Laboratories in Shoreline, WA.

COURSE OBJECTIVES: The lecture section of this one-day course will cover the following subjects: selected cases involving WBCs, RBCs, and/or platelet pathology; and examination of red and white cell morphology using Kodachrome slides. The laboratory section will include examination of actual case slides and examination of unknown specimens to test your abilities.

Tuition: $105.00 if registered on or before September 14, 2005, or $115.00 thereafter.

Basic Blood Cell Morphology Training Class Registration Form

Name:_____

Employer:_____

Employer Address:_____

City:_____ State: _____ Zip:_____

Work Phone:_____FAX:_____

E-mail:_____ Message Phone:_____

Class Date (check one): _____September 21 **OR** _____September 22

HOW TO REGISTER: Complete the registration form and mail to the **Department of Health, Training Program, 1610 NE 150th Street, PO Box 550501, Shoreline, WA 98155-9701,** fax to **206-418-5445** or e-mail to **phl.training@doh.wa.gov** A registration form is available at our web site: **www.doh.wa.gov/ehsphl/phl/train.htm**. DO NOT SEND MONEY WITH YOUR REGISTRATION FORM.

WNV Prevention

√ **REPELLENTS** containing DEET (N, N-diethyl-m-toluamide), Picaridin, or oil of lemon eucalyptus are most effective. Always follow instructions carefully.

√ **DUSK & DAWN** are when mosquitoes are most active, so limit outdoor activities or take precautions to prevent mosquito bites.

√ **DRESS** in long sleeves and pants during dawn and dusk or in areas where mosquitoes are active.

√ **DRAIN** standing water around the house twice weekly. It's where mosquitoes lay eggs. Include tires, cans, flowerpots, and toys.

√ West Nile Virus disease is rare but if you have symptoms including high fever, severe headache and stiff neck, contact your health care provider immediately.

Washington State Department of Health
http://www.doh.wa.gov/wnv

West Nile Virus hotline: 1-866-78VIRUS

Calendar of Events

PHL Training Classes:
(http://www.doh.wa.gov/EHSPHL/PHL/train.htm)

A Basic Course in Blood Cell Morphology
September 21 Shoreline **OR**
September 22 Shoreline

Northwest Medical Laboratory Symposium
October 26-29, 2005 Seattle

12th Annual Clinical Laboratory Conference
November 7, 2005 Seattle

2006 WSSCLS/NWSSAMT Spring Meeting
April 20-22, 2006 Seattle

Contact information for the events listed above can be found on page 2. The Calendar of Events is a list of upcoming conferences, deadlines, and other dates of interest to the clinical laboratory community. If you have events that you would like to have included, please mail them to ELABORATIONS at the address on page 2. Information must be received at least one month before the scheduled event. The editor reserves the right to make final decisions on inclusion.

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